

CLAIMS

1. A fine particle coated with ultra-fine particles having a grain diameter smaller than that of the fine particle or a thin film on a surface of the fine particle, which is
5 formed by carrying out a sputtering while stirring or rolling fine particles contained in a vacuum container having a polygonal internal shape in cross section by rotating the vacuum container about a rotating axis substantially perpendicular to said cross section, wherein

10 Said ultra-fine particle or said thin film is made of at least one of a metal catalyst, an oxide catalyst and a compound catalyst.
2. A fine particle coated with ultra-fine particles having a grain diameter smaller than that of the fine particle or a thin film on a surface of the fine particle, which is formed by carrying out a sputtering while stirring or rolling fine particles contained in a vacuum container having a polygonal internal shape in cross section by rotating the
15 vacuum container about a rotating axis substantially perpendicular to said cross section while giving vibrations
20 to said fine particles, wherein

25 Said ultra-fine particle or said thin film is made of at least one of a metal catalyst, an oxide catalyst and a compound catalyst.
3. A fine particle coated with ultra-fine particles

having a grain diameter smaller than that of the fine particle or a thin film on a surface of the fine particle, which is formed by carrying out a sputtering while stirring or rolling fine particles contained in a vacuum container having a 5 polygonal internal shape in cross section by rotating the vacuum container about a rotating axis substantially perpendicular to said cross section while directly or indirectly heating said vacuum container, wherein

Said ultra-fine particle or said thin film is made of 10 at least one of a metal catalyst, an oxide catalyst and a compound catalyst.

4. A fine particle, in which ultra-fine particles having a grain diameter smaller than that of said fine particle or 15 aggregations of said ultra-fine particles cohere continuously or discontinuously on a surface of said fine particle.

5. The fine particle according to claim 4, in which 20 ultra-fine particles having a grain diameter smaller than that of said fine particle or aggregations of said ultra-fine particles cohere continuously or discontinuously onto a surface of said fine particle, which is formed by carrying out a sputtering while stirring or rolling fine particles 25 contained in a vacuum container having a polygonal internal shape in cross section by rotating the vacuum container about a rotating axis substantially perpendicular to said cross

section.

6. The fine particle according to claim 4, in which
ultra-fine particles having a grain diameter smaller than
5 that of said fine particle or aggregations of said ultra-fine
particles cohere continuously or discontinuously on a
surface of said fine particle, which is formed by carrying
out a sputtering while stirring or rolling fine particles
contained in a vacuum container having a polygonal internal
10 shape in cross section by rotating the vacuum container about
a rotating axis substantially perpendicular to said cross
section while giving vibrations to said fine particles.

7. The fine particle according to claim 4, in which
15 ultra-fine particles having a grain diameter smaller than
that of said fine particle or aggregations of said ultra-fine
particles cohere continuously or discontinuously onto a
surface of said fine particle, which is formed by carrying
out a sputtering while stirring or rolling fine particles
20 contained in a vacuum container having a polygonal internal
shape in cross section by rotating the vacuum container about
a rotating axis substantially perpendicular to said cross
section while directly or indirectly heating said vacuum
container.

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8. The fine particle according to any one of claims 4 to
7, wherein said ultra-fine particles or aggregations of said

ultra-fine particles are made of at least one of a metal catalyst, an oxide catalyst and a compound catalyst.

9. The fine particle according to any one of the claims 5 1 to 3 and 8, wherein said metal catalyst is a metal selected from a group of Pt, Pd, Rh, Ru, Os, Ir, Re, Au, Ag, Fe, Ni, Ti, Al, Cu, Co, Mo, Mn, Nd, Zn, Ga, Ge, Cd, In, Sn, V, W, Cr, Zr, Mg, Si, P, S, Ca, Rb, Y, Sb, Pb, Bi, C and Li,

Said oxide catalyst is an oxide of one metal selected 10 from said group,

said compound catalyst is a mixture or an alloy of a plurality of metals selected from said group, a mixture of the respective oxides of a plurality of metals selected from said group, or a mixture of at least one metal selected from said 15 group and an oxide of at least one metal selected from said group.

10. The fine particle according to any one of claims 1 to 9, wherein said fine particle is used as an electrode catalyst 20 or an electrode material for a primary battery, a secondary battery, a solar battery or a fuel battery.